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SCIENCE AND SOIL FERTILITY

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A radio talk by Dr. Henry G. Knight, chief, Bureau of Chemistry and Soils, delivered Monday, December 19, 1932, in the Department of Agriculture period, National Farm and Home Hour, broadcast by a network of 48 associate NBC radio stations.

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SALISBURY: We start another week of Department of Agriculture periods in the National Farm and Home Hour with our thirteenth report from Dr. Henry G. Knight, the chief of the Bureau of Chemistry and Soils, on recent results of research work by chemists and soil scientists. Dr. Knight talks with us today about research to find the facts about soil fertility. Ladies and gentlemen, Dr. Knight.

KNIGHT: Thank you, Salisbury, and greetings of the season to you Farm and Home Hour listeners.

In my last two talks, I have given you an outline of the work of the soil surveyors and the men who are studying some of the problems of making and using fertilizers. The purpose of these men is to help maintain the fertility of our basic national asset -- the soil.

But their work does not deal with all the problems of maintaining soil fertility. Today I want to report to you some of the other lines of soil fertility research, explain how this Bureau carries on this research, and how you can obtain the results that may be helpful in operating your own farming business.

Now this term soil fertility covers quite a number of things. It covers natural influences that we can't control and others that we can control. Sunshine, rainfall, and temperature have much to do with the fertility of a piece of land. The texture of the land has much to do with the way rainfall and temperature change its fertility. We can't do much about the weather and the texture of the soil. But we can do something about other important elements of soil fertility such as the amount and kind of organic matter in the soil, whether its reaction is acid or alkaline, the amount of available plant food present, and the lack of minor soil elements such as magnesium, manganese, sulphur, and even copper, iodine, zinc, and other elements.

We are steadily discovering the facts about how to manage different soils in order to improve these important elements of fertility. But every farmer knows that what we find out about one type of soil does not necessarily apply to another type of soil. So I shall not try to give you any specific reports, for the results of each test must be interpreted in the light of their application to a definite soil type. The individual farmer, in maintaining soil fertility, has to obtain first of all the soil survey report on his land, then the report of results of research in maintaining fertility on his particular soil types. Our Bureau and the State Agricultural experiment stations have set up branches on most of the prominent soil types in different parts of the country, and we also cooperate with landowners in conducting further investigations on methods of maintaining soil fertility in local areas.

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Now, in general terms, I can point out to you some of the important general problems of soil fertility about which these experiments give us knowledge. One is the problem of how organic matter of the soil influences crops, and how to maintain a supply of the right sort of organic matter; another is the problem of the effect on crops of acidity or alkalinity in the soil, and how to change the soil reaction if necessary; and the third is the problem of finding some method of analysis that will reveal the plant food requirements of a soil without field trials.

Our experiments have confirmed the experience of farmers that it is decidedly important to maintain a large content of organic matter or humus in the soil. In the earlier days when every farmer used much barnyard manure it wasn't necessary to look for other sources of organic material. In recent years it has become necessary to look for more sources of organic matter and all soil scientists have been experimenting with green manure crops. Each farmer can get the results of these experiments applying to the type of soil on his farm through the office of his county agricultural agent.

For several years soil scientists have given attention to the question of soil reaction, especially of soil acidity. They have gone far in surmounting the difficulties of finding the basic chemical and physical facts. As they have gained this fundamental scientific knowledge, they have applied it to finding the influence of lime compounds and various fertilizer materials on the reaction of soils of different types. Here again the information that will be of immediate practical value has been given to the county agricultural agents who will pass it on to farmers.

Now for the third general problem of soil fertility research -- finding chemical and biological methods that will enable us to estimate the plant food requirements of any soil type without going through a long series of field tests. Not much success to report. Some of the methods proposed have their points of interest and are worthy of further investigation, but none has so far displaced field experiments.

Which brings me to a general report on the results of the field experiments in problems of soil fertility. I told you at the beginning that I would not give you any specific results, as each one applies to only one crop as grown on one type of soil. But I think you will be interested in knowing that, in cooperation with State experiment stations, we have gathered facts of this type on soil fertility requirements for cotton, potatoes, sweet potatoes, corn, many vegetable crops, certain leguminous crops, citrus fruits, nut crops, sugar cane, sugar beets, and strawberries.

We are working on other problems of soil fertility at various field stations of the Department. Here is a list of those investigations: In Texas, fertilizer and soil treatments as controls of cotton root rot; In Louisiana and Georgia fertility requirements of pecan growing; In Louisiana, sugar cane soil fertility problems; In Florida, soil fertility for growing citrus and truck crops; in North Carolina, soil fertility for growing strawberries; in South Carolina, fertility problems of the Sandhill section; in Nebraska and North Dakota, soil fertility for growing sugar beets.

May I again say that any of you growing these crops in these sections may obtain full reports on the results of our research either from your county agricultural agents, or by writing to us. Address the Bureau of Chemistry and Soils, Washington, D. C.

Now I wish all of you a very Merry Christmas. I'll return on December 28 to tell you more about the results of soil fertility research.